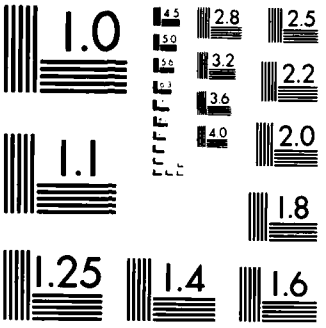
AD-A158 379 EVALUATION OF ARMY'S MOBILE SUBSCRIBER PROGRAM(U) 1/1
GENERAL ACCOUNTING OFFICE WASHINGTON DC NATIONAL
SECURITY AND INTERNATIONAL AFFAIRS DIV 16 JUL 85
UNCLASSIFIED GAO/NSIAD-85-117 F/G 15/5 NL



BY THE U.S. GENERAL ACCOUNTING OFFICE

Report To The Chairman, Subcommittee On Defense, Committee On Appropriations House Of Representatives

Evaluation Of Army's Mobile Subscriber Equipment Program

The Army has embarked on a multibillion dollar acquisition of mobile subscriber equipment to improve communications at corps and division levels. By buying "off-the-shelf" and keeping production at a steady pace, Army officials expect to save considerable time and money over traditional procurement methods. While the potential benefits are large, the strategy also presents risks, since neither of the proposed systems is purely nondevelopmental and the chosen system will not be subject to test and evaluation before full-scale production.

GAO supports the Army's efforts to improve the acquisition cycle, and believes that steps taken have reduced program risks considerably. However, some concerns remain about system readiness for full-scale production.

To satisfy the production readiness concerns and still preserve momentum of the Army's innovative approach, the Subcommittee may want to consider a plan that allows production to begin, but at a lower rate until test and evaluation are successfully completed.

GAO/NSIAD-85-117
JULY 16, 1985

UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

NATIONAL SECURITY AND
INTERNATIONAL AFFAIRS DIVISION

B-215307

The Honorable Joseph P. Addabbo
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives

Dear Mr. Chairman:

As requested in your April 2, 1984, letter, and based on subsequent discussions with your office, we have reviewed the Army's effort to acquire mobile subscriber equipment (MSE) for tactical communications. Our August 1984 letter to you highlighted the MSE acquisition plan and discussed several issues that came up in the initial stages of our review. We also had several meetings with your staff throughout the year to provide information as this important acquisition proceeds. This report provides additional information about MSE cost and timetable, and focuses on the issue of system readiness for full-scale production.

The Army plans a multibillion dollar acquisition of MSE to replace the aging mix of current equipment and improve communications at corps and division levels. By buying this system "off-the-shelf" and keeping production at a steady pace, Army officials expect to save considerable time and money over traditional procurement methods which involve a lengthy development and test phase. While the benefits may be large, the strategy also presents technical and program risks, since neither of the proposed systems is purely nondevelopmental and the chosen system will not be subject to test and evaluation before full-scale production.

We support the Army's effort to improve the acquisition cycle with MSE, and believe that steps taken by it have reduced program risks considerably. However, some concerns remain about the general readiness of MSE for full-scale production. To satisfy these concerns and still preserve momentum of the Army's bold acquisition approach, you may want to consider a plan that allows production to begin, but at a lower rate than that planned by the Army until test and evaluation are completed and

the system demonstrates it can meet operational requirements. These and other matters are discussed more fully in the appendixes.

The Department of Defense officials generally concurred with our findings and are planning to review program risks before the Army announces its source selection decision. Army officials believe that they have taken sufficient precautions to justify full-scale production. They also point out that lower initial production of MSE will increase program costs and hurt operational readiness. We believe the additional costs claimed by the Army for our recommended low-rate of production are minimal considering total MSE procurement cost and the fact that untested system modifications have changed the nondevelopmental nature of the program.

We hope this information will be of use to your Subcommittee during its deliberations. If we can be of further assistance, please let us know.

Sincerely yours,

Frank C. Conahan

Frank C. Conahan
Director

EVALUATION OF THE ARMY'S MSE ACQUISITION

ACQUISITION APPROACH: THE FACTS AND FIGURES

The Under Secretary of the Army, in January 1984, directed the Army to procure MSE using the nondevelopmental item acquisition approach. This approach maximizes the use of existing production hardware and software by purchasing a system off-the-shelf without the usual additional time and money spent on research, development, test, and evaluation associated with a totally new system. The nondevelopmental item approach recognizes that in some cases equipment and systems are available for acquisition with little or no development effort, which can be selected from commercial products, materiel developed by other military services or agencies, or developed by other countries.

Acquisition guidelines

The Army chose the nondevelopmental item approach because it believed that this approach could expedite fielding of the MSE system while satisfying the operational needs of the Army, maintaining competition, and ensuring a reasonable level of program risk and cost. The Army also views the nondevelopmental item approach as a way to improve Army acquisition methods and allow the service to keep current with technological advances. In acquiring MSE as a nondevelopmental system, Army officials have provided the following guidelines.

1. Procure an existing system.

2. Adapt Army operational requirements to the capabilities of the existing system.

3. Maximize the use of commercial practices where the contractor provides a "total package", including fielding and initial training. Use of government furnished equipment (GFE) is not acceptable.

4. Do not mandate that the proposal conform to military standards and specifications.

5. Do not tell the offerors "How to do". Let the offerors propose their way and then negotiate the differences.

6. Use a common sense approach rather than a bureaucratic attitude that everything must conform to the traditional methods.

Contract structure

The MSE contract will provide equipment for 5 corps and 26 divisions and a training base set of equipment. There will be a basic contract award plus six one-year production options, with the objective of equipping a corps each year. The Army chose a firm fixed-price contract for the MSE procurement because this contract will lock the contractor into a set price, resulting in more predictable program costs.

System requirements and features

The MSE request for proposal, issued in July 1984, solicited bids from industry for a baseline MSE system already in existence. It contained three kinds of requirements and features that the Army has used to evaluate the proposed systems: baseline functional requirements, mandatory priced options, and other desired features.

The proposed system is required to provide an area communications system with a mobile radio-telephone capability for the tactical operations of a U.S. Army Corps and its divisions and, at a minimum, be able to satisfy five component system requirements, as follows.

1. Subscriber Terminals are the telephones, facsimiles, and data terminals that the users need to access the MSE system.

2. Mobile Subscriber Access permits mobile users to automatically communicate with other mobile and stationary subscribers throughout the network.

3. Wire Subscriber Access provides concentrations of switched stationary users such as command posts to communicate with other users in the network.

4. Area Coverage provides the automatic digital network capability to enable access from anywhere within the MSE system by mobile and wire subscribers.

5. System Control provides an automated capability for managing an MSE network.

In addition to the baseline system, certain specific interface and performance capabilities were also to be proposed as mandatory priced options. Each proposal was required to provide an accounting of the effort and cost to incorporate these options into the baseline MSE if they were not in the proposed existing system. They include the following.

1. Use of standard United States equipment:

   --trucks,
   --shelters,
   --generators, and
   --air conditioners.

2. Interface/Interoperability capabilities:

   --satellite communications,
   --current circuit and message switches,
   --combat net radio,
   --North Atlantic Treaty Organization (NATO),
   --standard record traffic terminal,
   --facsimile, and
   --commercial telephone system.

3. Other options:

   --survivability in an electromagnetic pulse environment,
   --conform with United States environmental emission standards, and
   --capability to ford deep water.

Unlike the five baseline functional capabilities, the mandatory priced options do not have to be available (that is, in production) at the time of the bid. The Army recognized that some mandatory priced options could require development.

Lastly, the request for proposal listed a considerable number of features which the Army desires, but which it believed were not incorporated into an existing system. Candidate systems having more of these desired features would be evaluated more favorably than those with fewer. For example, high-speed data transmission and transportability on C-130 aircraft are capabilities the Army has identified as desired features.

Proposals

Two groups of companies have offered proposals for an MSE system. Rockwell International, supported by International Telephone and Telegraph and Plessey Defense Systems of the United Kingdom, has offered a version of the British Ptarmigan system. General Telephone and Electronics (GTE) is supported by Thomson-CSF of France in offering a version of the French RITA system. Both systems are currently in use in Europe.

Strictly speaking, neither of the two proposals is an off-the-shelf system. The need to provide more desired features, along with competitive pressure, have caused each contractor to modify existing systems, thus creating systems with a mix of components and capabilities that is different from the basic French or British counterparts. The proposal made by GTE, for example, includes the TTC-39 circuit switch, developed in the United States, as the system's primary switch. The Rockwell proposal similarly contains the SB-3865 switchboard, also developed in the United States, as the small extension switch. Although both proposed systems have many off-the-shelf components, they have not been produced and tested as fully integrated systems.

Evaluation process

To select the best proposal, a comprehensive evaluation process was established. Each proposal is being evaluated in five major categories:

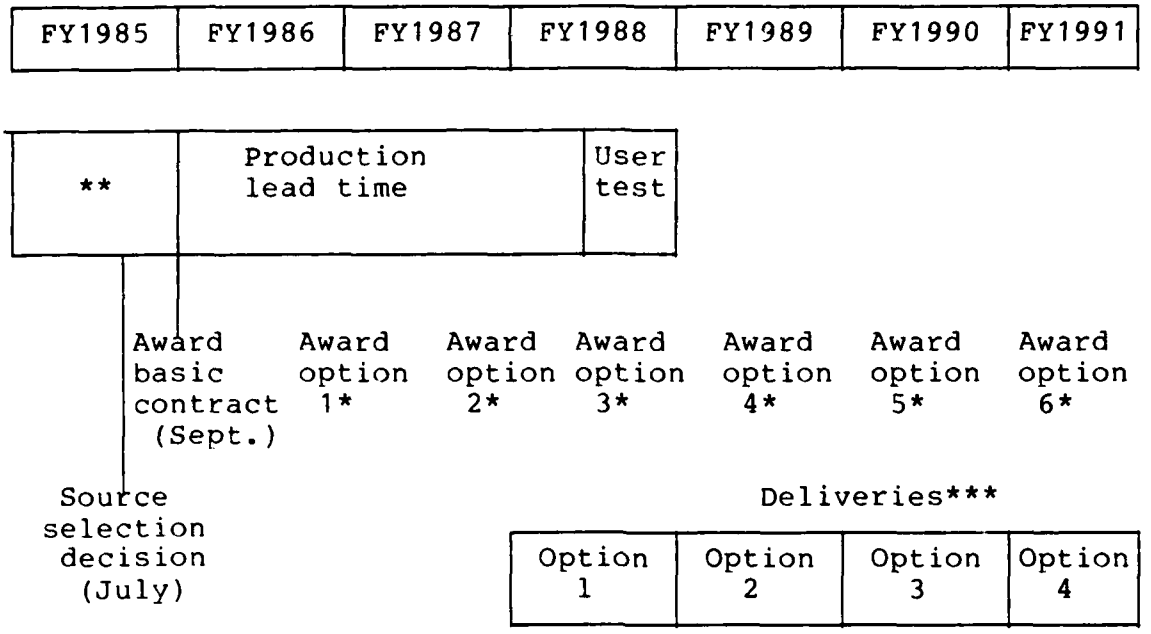
--operational suitability,
--cost/price,
--technical,
--logistics, and
--management.

In addition, each offered system was demonstrated for Army evaluators in the field under conditions similar to a tactical environment. Based on the demonstrations and ongoing negotiations, each proposed system has since been reconfigured and each contractor given an opportunity to present its best value system for evaluation. According to Army officials, the best and final offer represents each contractor's best price for the system and its support. The offered price, along with results of the Army's evaluation of operational suitability and supportability, is the basis on which final selection will be made.

Acquisition milestones

To get a fully secure, mobile area communications system to deployed forces as soon as practical, the Army has called for an aggressive production and deployment schedule. The total system is planned for full fielding by 1993. Production award dates have been structured to maintain continuous production. Key dates are shown in the following schedule.

APPENDIX I



*Army officials say these production options will be awarded subject to availability of funds and to support a continuous production line.

**Evaluation of proposals submitted in response to request issued July 2, 1984.

***Deliveries of items under the basic contract award will begin during production lead time and are scheduled for completion before the user test is started.

Funding and estimated cost

The estimated procurement cost for MSE is about $4.2 billion. Although the following funding profile reflects this estimate, the Army will not know the true cost of MSE until the contractor is selected.

Fiscal year	1985	1986	1987	1988	1989	1990
	----------(in millions)----------					
Funds required	$63.3	$335.3	$786.3	$976.8	$944.3	$1,078.4
Total						$4,184.4

The Army has recently programmed $840 million to purchase MSE for additional anticipated units which may be purchased in fiscal year 1991 with a sixth production option.

Requirements versus capabilities

Both competing offerors have provided a variety of capabilities in their baseline systems that were listed only as mandatory priced options and desired features. It appears the Army will acquire an MSE with most of the interfaces, mobility features, and other capabilities that interested parties inside and outside the service have contended are essential for battlefield communications. Moreover, features not provided on initial production units may be added later through preplanned product improvements.

Because interoperability, mobility, and antijam capability are critical to combat success, certain officials in the Congress, the Department of Defense (DOD), and the Army have voiced concerns about the MSE program's approach to these needed capabilities. Several were unsure how such features could be achieved with a request for proposal that lists them only as desired features or priced options. For example, one official said that MSE interoperability with other service and NATO systems is an absolute requirement and should be treated as such in the acquisition process.

MSE acquisition officials said they had no intention of ignoring important features such as interoperability. In order to buy MSE as a nondevelopmental item, however, mandatory requirements had to be kept to a minimum. With this acquisition strategy, offerors were asked to provide their own solutions to the Army's stated needs.

Now that the proposals have been received and demonstrated, the Army will apparently get a system with many desired features and options. For interoperability, the proposed systems include interfaces with all systems identified on page 3, including satellite communications and commercial telephone networks. Mobility is provided by both systems' proposals to reconfigure MSE items in the new High Mobility Multi-Purpose Wheeled Vehicle and other standard Army vehicles. Finally, some antijam capability is provided in each proposed system through features such as flood searching and automated power adjustments. Additional capability to overcome electronic jamming can be developed through product improvements after the system is fielded, according to MSE program officials.

ARMY HAS MINIMIZED MOST RISKS BUT READINESS FOR FULL-SCALE PRODUCTION IS NOT ENSURED

As with most large system acquisitions, a variety of risks is associated with MSE. Some are rather small since much of the equipment and software to be used has already been developed and produced. With other aspects of the system that require modification, the Army has taken a variety of steps to reduce

the chances for problems. While these efforts are important, one major question remains: How will the MSE system perform in its intended operational environment? The Army will not know the answer until after the system is in full-scale production.

The two competing MSE systems contain components that were already developed for military use. The risk that these will fail seems relatively small. The telephones and facsimile machines proposed for both candidates, for example, are either standard or slightly modified versions of equipment the Army has bought for other systems. Also, the proposed training programs have already been developed and used by British, French, and Belgian armies for several years. Although some modifications may be necessary for the MSE system, Army evaluators have seen these components and have little reason to believe they will cause problems when MSE is produced and fielded.

With other aspects of MSE, however, the risks are higher. One of the biggest concerns for the Army is how well the contractors can integrate the mix of equipment and software into a mature system. While it is true that systems were demonstrated for Army evaluators, these systems are different from what Army will contract for. Both proposals, for instance, include plans to reconfigure equipment on standard Army vehicles rather than the foreign vehicles it was originally designed for. This may be an easy task, but Army evaluators did not see this feature demonstrated. A similar situation exists with changes in operating frequencies for both systems. The systems were demonstrated with their original foreign frequencies, but the Army has since requested changes necessitated by frequency allocation concerns in the United States. Thus, the equipment with the changed frequencies will not have been demonstrated even though they will be incorporated into production models.

Army officials have already taken steps to prevent problems during the acquisition process. These steps shift production and performance risk to the contractor.

--A warranty is being negotiated to provide guarantees against flaws in system design, workmanship, and performance of all equipment. Problems with this equipment must be fixed by the contractor. The warranty will be in accordance with the 1985 DOD Authorization Act and will cost an estimated 2 percent of total contract price.

--The Army is purposely excluding the use of GFE as part of the contract terms. Army officials believe that GFE in the past has provided contractors an easy excuse for things that have gone wrong, and they are determined to avoid the GFE syndrome on the MSE acquisition. This policy may cost more initially because the government

could possibly provide equipment less expensively than prime contractors. The intent, however, is to make the contractor accountable for all aspects of the program.

--A poor record of delivery and acceptance could cause the Army to suspend all progress payments.

--The Army's independent test agency will continuously evaluate the MSE acquisition to monitor production and performance. It includes demonstrations and test results during proposal evaluation, testing during production lead time, a user follow-on test phase, and a post fielding evaluation phase.

These efforts, combined with the fact that most MSE components have already been developed, make Army officials confident of a successful program.

While the planned steps appear to provide considerable protection for the government if something goes wrong, Army officials will not know how well its system works in an operational environment until well into the production program. The user follow-on test and evaluation of MSE, which will be done as a tactical field training exercise, will not be completed until after the Army has given the go-ahead to produce a substantial amount of equipment. (This aspect of the program is shown in the chart on page 5.) Consequently, any system deficiencies detected during the fiscal year 1988 evaluation will have to be corrected on more than a billion dollars' worth of equipment already produced or in production, which could delay fielding.

Our concern is the demonstration of total system production readiness and operational effectiveness before full-scale production. Many pieces that will comprise MSE have demonstrated that they will work. The TTC-39 switch that is a key component of one proposal, for instance, has been tested and recently entered the Army inventory. Also, Army evaluators have seen assemblages of proposed MSE items demonstrated in contractor-run exercises. The fact remains, however, that the Army will not subject its chosen MSE system to the kind of operational testing that could answer questions such as:

--Does the system adequately support communications needs in a highly stressed wartime environment?

--Are equipment interfaces adequate for command and control of the Army's Air Land Battle?

--Does equipment meet the ease of repair requirements contained in system specifications?

--How does MSE work when exposed to electronic warfare?

--Do the radio frequency adjustments sought by the Army satisfy battlefield needs.

Congressional, DOD, and service decisionmakers have traditionally sought answers to similar questions before approving large-scale production.

While there is general recognition of the MSE program's innovative approach and its potential benefits, concerns remain about the large commitment to production before completing user testing. The Senate Armed Services Committee, in its report on the Army's fiscal year 1986 appropriations request, stated that substantial operational testing "appears necessary to address concerns over the issues of interoperability and susceptibility to electronic jamming." The Committee directed that no more than half the 1986 funds provided for MSE procurement can be obligated before the Army presents a testing plan to the Congress. Also, DOD's operational test and evaluation office directed that a formal operational testing period be scheduled by the Army to answer questions of decisionmakers before approval of full-scale production. According to the Director, Operational Test and Evaluation,

> "Neither a demonstration by contractors nor a piecemeal evaluation of subunit performance is considered an acceptable alternative to an operational test."

CONCLUSIONS

The nondevelopmental strategy for MSE has the potential to save considerable time and money over traditional procurement methods in meeting an urgent need for better communications, but also presents some risks, since the system will not be subject to test and evaluation before full-scale production. Army officials have taken a variety of steps to reduce the risks. According to Army officials, their current plan to approve large-scale production of MSE before receiving test and evaluation results is necessary to satisfy urgent requirements and achieve the program benefits envisioned.

We support the Army's efforts to improve the acquisition cycle, and believe the steps taken have reduced program risks considerably. Still, concerns remain because neither of the two proposed systems is purely nondevelopmental. Several system features such as interfaces and frequency adjustments have not been fully tested, nor have the systems proposed by the contractors been evaluated in a United States operational environment. Based on the Army's current acquisition timetable and program budget, the Congress would have appropriated about half of the estimated $4.2 billion procurement costs before user testing of MSE is completed.

Army officials said that the procurement of an off-the-shelf item is a key to satisfying the urgent need for better communications at a lower cost than would be possible with a developmental and test approach. They also said that risks have already been minimized by such things as a warranty and continuous evaluation of MSE items.

Our evaluation of the acquisition indicates a way to preserve the momentum of this bold approach and still satisfy concerns about MSE production readiness. This can be done by reducing production in the early years before test and evaluation are complete, thus minimizing the government's commitment before testing without interrupting the production lines. To precisely determine what should be the lower production rate is difficult, but the Army could continue the program by having fewer divisions' worth of equipment produced than the 12 divisions that are now scheduled for production before user testing. An illustration of how this might be done by producing 8 rather than the 12 sets is shown in appendix II. Once tests prove the system is ready, the Army could approve large-scale production consistent with its original procurement and fielding schedule.

We recognize that while lower initial production of MSE will further reduce program risks, it could also increase the costs of early production units because of fewer production economies and increase cost of deferred units because of inflation. This cost impact, however, could be minimized because production lines would remain open and ready for increased activity after successful testing is accomplished.

MATTER FOR CONSIDERATION BY THE CONGRESS

In order to preserve the benefits of the MSE acquisition strategy and still satisfy concerns about the system's production readiness, the Subcommittee may want to consider a plan that limits production in the early years before test and evaluation are complete. Once successful testing is accomplished, full-scale production consistent with the Army's fielding objectives could be considered.

AGENCY COMMENTS AND OUR EVALUATION

Officials in the Office of the Secretary of Defense (OSD) generally concurred with our findings. Army officials believe that MSE program risks have been reduced sufficiently to warrant full-scale production. They provided us their comments in meetings where we discussed our draft report.

OSD officials recognize the potential benefits and risks involved with the MSE acquisition and have stated their intent to evaluate the risk factors before large-scale production is approved. Their review is expected in July before the Army announces its source selection decision to the Congress.

Army officials understand the concern about remaining program risk but believe sufficient precautions have been taken to justify full-scale production. They do not think that the additional information obtained from operational testing is worth the increased program costs that will result from production delays and reduced readiness of Army combat units. In their view, a deferral of some MSE production carries a greater operational risk for the Army than does a commitment to full-scale production.

We remain convinced that the Army can reduce the program risk further and still achieve most of the benefits of its nondevelopmental approach to MSE. Operational test and evaluation is the most effective way, under peacetime conditions, to determine a major system's combat worth. Under the current plan, the chosen MSE will not be subject to such testing before full-scale production. A lower initial production, such as that shown in appendix II, could allow the Army to reduce the level of funds committed to the program before test results are obtained. Additional costs for this lower initial production rate, we believe, are minimal considering the total MSE procurement cost of $4.2 billion and the fact that untested system modifications have changed the nondevelopmental nature of the program.

OBJECTIVES, SCOPE, AND METHODOLOGY

Our objectives were to evaluate the MSE acquisition and identify issues affecting the Army's plan to improve its communications capabilities. We were especially interested in issues related to affordability, interoperability, mobility, and sustainability of the MSE system.

During our review we discussed aspects of the MSE program and reviewed documents at numerous organizations in the Army and DOD. Among locations visited were: Army Communications-Electronics Command, Fort Monmouth, New Jersey; Army Signal Center, Fort Gordon, Georgia; Headquarters, U.S. Army, Europe; and the DOD Office for Operational Test and Evaluation, Washington, D.C. We also observed demonstrations of proposed MSE systems, along with Army source selection officials, in England and France, and gained access to selected information from the MSE proposals.

Our review was performed in accordance with generally accepted government auditing standards.

WHAT DOES LOWER INITIAL PRODUCTION OF MSE MEAN?

Our evaluation of the MSE program leads us to believe that its potential benefits are considerable but the system chosen may not be ready for full-scale production. A strategy to limit initial production until testing is completed seems reasonable to keep the program's momentum and still satisfy production readiness concerns. The following tables, based on Army acquisition plans, show one example of how this might be done. The major aims are to produce the amount of equipment needed for evaluation while reducing the percentage of total MSE costs that will have to be committed before the user test results are known.

	FY1985	FY1986	FY1987	FY1988	FY1989	FY1990
Army Plan						
Funds requested	$63m	$335m	$786m	$977m	$944m	$1,078m
Number of MSE sets procured	.6	3.4	8	11	9	13
Total number of MSE sets						45
Alternate GAO Plan[a]						
Funds needed	$63m	$236m	$491m	$977m	$1364m	$1,078m
Number of MSE sets procured	.6	2.4	5	11	13	13
Total number of MSE sets						45

User test scheduled March 1988 to September 1988

[a]This illustrative plan to reduce early MSE production is also consistent with the following criteria used by MSE program officials.

a. Quantities produced fall within the range being negotiated as part of contract terms and conditions.

b. The schedule supports a gradual buildup of production capacity.

c. The schedule supports the Army's plan to field MSE to one corps each year.

Under the current plan, the Army will have contracted for about $2.2 billion of MSE items (basic contract plus options in fiscal years 1986, 1987 and 1988) before the user evaluation is completed at the end of fiscal year 1988. Furthermore, the budget process would require that fiscal year 1989 procurement funds be appropriated as well, bringing the total congressional commitment to about $3.1 billion before the tests are completed. This is more than two-thirds of the projected MSE procurement costs.

The alternate plan is based on lower production in the first 2 years. It shows the Army would contract for $1.8 billion of MSE items before receiving the user test results. Risk is also reduced because most of these funds are for the option exercised in fiscal year 1988 and would not have to be disbursed fully until after the test and evaluation results are known. This plan provides sufficient MSE items for testing and training and allows production to continue. It is also consistent with the flexible production ranges being negotiated for the MSE contract.

(395009)

END

FILMED

10-85

DTIC